

## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : CANON INC

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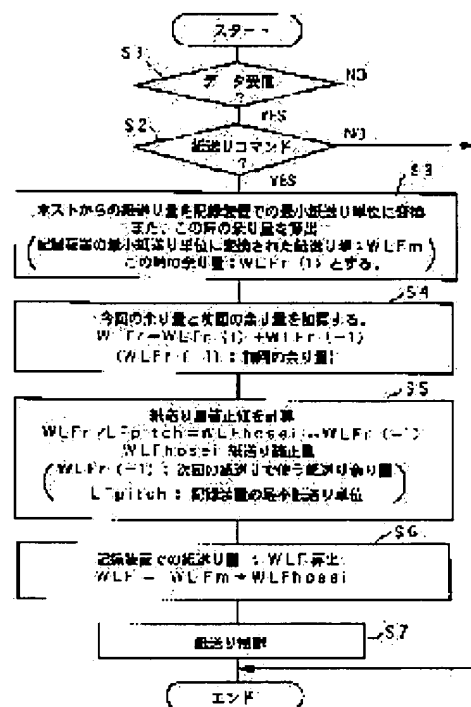
(72)Inventor : KONO TETSUSHI  
OTA MUNEHIKO

(54) RECORDING DEVICE

(57)Abstract:

PURPOSE: To always maintain excellent quality of record by keeping an accumulated error of paper feed quantity caused by difference between a paper feed quantity unit in a recording device and an instructed paper feed quantity unit given to the device within a fixed range by a simple procedure.

CONSTITUTION: An instructed paper feed quantity from a host device is converted into a minimum paper feed unit (WLFm) of a recording device and an error generated from it (remaining quantity WLFr (-1)) is calculated (step S3). Next, the remaining quantity WLFr (-1) generated at the time of next paper feed is added to a remaining quantity WLFr (1) (step S4). A paper feed correction quantity WLFhosei obtained by converting the result into the minimum paper feed unit and the remaining quantity WLFr (-1) to be used next time are obtained (step S5). Finally, a paper feed quantity  $WLF = WLFm + WLFhosei$  is obtained.



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CLAIMS

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[Claim(s)]

[Claim 1] The paper feed means which carries out paper feed of the recorded media to said recording head in the recording device which records on recorded media using a recording head, While converting the sum of the amount of directions paper feeds and cumulative error which are directed to the recording device concerned per paper feed of the recording device concerned The recording device characterized by having an operation means to compute the error at the time of these conversion as a cumulative error, a storage means to memorize the cumulative error which this operation means computed, and a vertical-format-unit means to make paper feed carry out to said paper feed means in the amount of paper feeds of said paper feed unit which said operation means converted.

[Claim 2] Said recording head is a recording device according to claim 1 characterized by being what ink is made to produce air bubbles using heat energy, and carries out the regurgitation of the ink with generation of these air bubbles.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a recording device with the configuration which amends the amount of paper feeds in detail about a recording device.

[0002]

[Description of the Prior Art] As for the paper feed in a recording device, it is common to be carried out on the basis of the amount of unit paper feeds which the equipment has. That is, this amount of unit paper feeds will become settled by use of the gear which transmits the stepping motor used as a driving source, and this driving force, a paper feed roller, etc., and the amount of that integral multiple will be sent in actual paper feed.

[0003] On the other hand, also about directions of the amount of paper feeds in the above recording devices, it is directed as an integral multiple of a predetermined paper feed unit, and differs from the amount of unit paper feeds which this predetermined paper feed unit and the above-mentioned equipment have in many cases. This is because a recording device is connected and the specifications of host equipment, i.e., various information processors, using this as an information output unit etc. differ.

[0004] As mentioned above, when the unit quantity of directions paper feed differs from the actual amount of unit paper feeds of a recording device, an error will arise for every paper feed and the grace of the alphabetic character recorded as this is accumulated, and an image will be spoiled.

[0005] The configuration which makes this cumulative error fixed minute within the limits is indicated by JP,4-81518,B and JP,5-1740,B. Each configuration indicated by these official reports governs a cumulative error in the range of  $\pm 1/2$  of the amount of unit paper feeds in a recording device.

[0006]

[Problem(s) to be Solved by the Invention] However, since the configuration for the cumulative error control indicated by each above-mentioned official report makes it into the range of  $\pm 1/2$  as mentioned above, the processing for evaluation of the error produced for every paper feed, i.e., magnitude with error, is [ judgment processing of size or fossete or data processing of rounding off ] needed from the above  $1/2$ , and there is [ a problem that an operation becomes comparatively complicated ].

[0007] The place which this invention is performed based on such a viewpoint, and is made into the purpose governs a cumulative error within fixed limits by simpler processing, and is to offer the recording device which can record always good grace by proper paper feed.

[0008]

[Means for Solving the Problem] Therefore, this invention is set to the recording device which records on recorded media using a recording head. While converting the sum of the paper feed means which

carries out paper feed of the recorded media to said recording head, and the amount of directions paper feeds and cumulative error which are directed to the recording device concerned per paper feed of the recording device concerned It is characterized by having an operation means to compute the error at the time of these conversion as a cumulative error, a storage means to memorize the cumulative error which this operation means computed, and a vertical-format-unit means to make paper feed carry out to said paper feed means in the amount of paper feeds of said paper feed unit which said operation means converted.

[0009]

[Function] According to the above configuration, the cumulative error produced for every activation of paper feed can perform the amount calculation of paper feeds by simple processing while always being governed within fixed limits.

[0010]

[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing.

[0011] Drawing 1 is the outline perspective view showing the ink jet recording device concerning one example of this invention.

[0012] This equipment is the printer of the full color serial type equipped with the exchangeable recording head corresponding to the ink of black (Bk) (cyanogen C) (Magenta M) (yellow Y) 4 color. The heads used for this printer are resolution 400dpi and 4kHz of drive frequencies, and have 128 deliveries.

[0013] In drawing 1, C is four record head cartlidges corresponding to each ink of Y, M, C, and Bk, and the recording head and the ink tank which stored the ink which supplies ink to this are formed in one. It is equipped with each record head cartlidge C free [ attachment and detachment ] by the non-illustrated configuration to carriage 2. Carriage 2 is connected to some driving belts 52 which are engaged possible [ sliding ] in accordance with the guide shaft 11, and move by the non-illustrated horizontal-scanning motor. Thereby, the record head cartlidge C becomes movable [ for the scan in alignment with the guide shaft 11 ].

[0014] 15, 16, and 17 and 18 are conveyance rollers which extend almost in parallel with the guide shaft 11 in the \*\*\*\*\* side of the record section by the scan of the record head cartlidge C, and a near side. The conveyance rollers 15 and 16, and 17 and 18 are driven by the non-illustrated vertical-scanning motor, and they convey a record medium P. This record medium P conveyed counters the field in which the delivery side of the record head cartlidge C was arranged, and constitutes a recording surface.

[0015] Control of the amount of paper feeds is performed by the configuration by which conveyance (henceforth paper feed) of this record medium P is later mentioned in drawing 3 and drawing 4.

[0016] The field where the cartridge C which adjoins the record section by the record head cartlidge C is movable is attended, and a recovery system unit is prepared. In a recovery system unit, 300 is the cap unit prepared respectively corresponding to two or more cartridges C which have a recording head, and it can be gone up and down in the vertical direction while being able to slide to the longitudinal direction in drawing with migration of carriage 2. And when carriage 2 is in a home position, it joins to the recording head section and capping of this is carried out. Moreover, in a recovery system unit, it is the blade cleaner which becomes with an absorber in order that 401 and 402 may clean the 1st and 2nd blades as a wiping member and 403 may clean the 1st blade 401, respectively.

[0017] Furthermore, 500 is a pump unit for absorbing ink etc. from the delivery of a recording head, and its near through the cap unit 300.

[0018] Drawing 2 is the block diagram showing the example of a configuration of the control system

in the above-mentioned ink jet recording apparatus.

[0019] It is the controller by which 100 makes the main control section here, and has RAM105 which prepared ROM103 which stored the program corresponding to CPU101 of a microcomputer gestalt, and its procedure for example which performs the sequence concerning the paper feed later mentioned in drawing 4 etc., a table and the electrical-potential-difference value of a heat pulse, and the fixed data of pulse width and others and the field which develops image data, the field of a working-level month, etc. 110 is host equipment (you may be the reader section of image read) which makes the source of supply of image data, and image data, other commands, a status signal, etc. are transmitted and received with a controller through an interface (I/F) 112.

[0020] 120 is a switch group which receives the command input by the large recovery switch 126 grade for directing the copy switch 124 for ordering it an electric power switch 122 and record (copy) initiation, and starting of large recovery, and the operator. 130 is a sensor group for detecting the sensor 132 for detecting locations of carriage 2, such as a home position and a start position, and the sensor 134 grade used including the leaf switch 130 for pump location detection, and a device status.

[0021] 140 is a head driver for driving the electric thermal-conversion object of a recording head according to record data etc. Moreover, it is used also for a part of head driver driving the temperature heaters 30A and 30B. Furthermore, a temperature detection value is inputted into a controller 100 from temperature sensors 20A and 20B. A horizontal-scanning motor for 150 to move carriage 2 to a main scanning direction (longitudinal direction of drawing 1 ) and 152 are the driver. 160 is a vertical-scanning motor, and it is used in order to convey a record medium (vertical scanning).

[0022] Drawing 3 is the block diagram showing functionally the configuration of the amount control of paper feeds concerning one example of this invention, and this configuration is specifically constituted as the controller 100 shown in drawing 2 , and its software.

[0023] In drawing 3 , the amount of paper feeds of directions paper feeds outputted from host equipment, i.e., the amount, is converted into the unit of the amount of unit paper feeds which the printer shown in drawing 1 with the amount unit conversion means 1101 of paper feeds has. Next, based on the amount of paper feed remainders explained to a detail by this amount of conversions and drawing 4 , the actual amount of paper feeds is computed by the amount calculation means of paper feeds, and it is sent to a vertical-format-unit means. A vertical-format-unit means performs an actual vertical format unit through control of a drive of the vertical-scanning motor 160 (refer to drawing 2 ) etc. based on this amount of paper feeds.

[0024] Drawing 4 is a flow chart which shows the procedure of a configuration of being shown in drawing 3 .

[0025] At step S1, if the existence of the data reception from host equipment is judged and data reception is judged, it will shift to step S2. Moreover, when it is not data reception, it ends. At step S2, the receiving command from host equipment distinguishes whether it is a paper feed command. If it is a paper feed command, it will shift to step S3, and when it is not a paper feed command, processing of the amount amendment of paper feeds is ended similarly.

[0026] At step S3, the amount of directions paper feeds from host equipment is converted per the minimum paper feed of a recording device. This conversion \*\* the amount of directions paper feeds per [ above-mentioned ] the minimum paper feed, and makes that quotient a reduced property. Namely, it is referred to as WLFr (1) by making into the amount of paper feed remainders the remainder which sets to WLFm as an amount of paper feeds into which the quotient used as integer part was changed per the minimum paper feed of a recording device, and serves as a fraction.

[0027] In step S4, an amount WLFr (-1) is added and it is referred to as WLFr just because it was finally obtained by the amount WLFr of paper feed remainders (1) calculated above, and the last paper

feed. Furthermore, at step S5, this aggregate value WLFr is  $\frac{WLF_{total}}{LFpitch}$  per [ LFpitch ] the minimum paper feed of a recording device, and it considers as the amount WLFr of paper feed remainders (-1) which uses the fraction which are the amount WLFhosei of paper feed amendments, and a remainder about the integer part used as a quotient at the time of next paper feed.

[0028] At step S6, the above-mentioned amount WLFm of paper feeds and the amount WLFhosei of paper feed amendments which were changed per the minimum paper feed in a recording device are added, and it considers as this final amount WLF of paper feeds. And this computed vertical format unit for the amount WLF of paper feeds is performed at step S7.

[0029] According to the above-mentioned example, while being able to govern an accumulation paper feed error between the minimum paper feed units from 0 of a recording device, the processing which the amount calculation of paper feeds takes will not need processing of size decision etc., but it will end with simple processing of a division etc., so that clearly [ the above explanation ]. Moreover, the amount of paper feeds always becomes less than the amount of directions paper feeds.

[0030] (in addition to this) In addition, especially this invention is equipped with means (for example, an electric thermal-conversion object, a laser beam, etc.) to generate heat energy as energy used also in an ink jet recording method in order to make the ink regurgitation perform, and brings about the effectiveness which was excellent in the recording head of the method which makes the change of state of ink occur with said heat energy, and the recording device. It is because the densification of record and highly minute-ization can be attained according to this method.

[0031] About the typical configuration and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By impressing at least one driving signal which gives the rapid temperature rise which supports recording information and exceeds nucleate boiling Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a recording head is made to produce film boiling and the air bubbles in the liquid (ink) corresponding to this driving signal can be formed by one to one as a result, it is effective. A liquid (ink) is made to breathe out through opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of air bubbles will be performed appropriately instantly, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.

[0032] As a configuration of a recording head, the configuration using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight-line-like liquid flow channel or right-angle liquid flow channel) of a delivery which is indicated by each above-mentioned specification, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, the effectiveness of this invention is effective also as a configuration based on JP,59-138461,A which indicates the configuration whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which uses a common slit as the discharge part of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to a discharge part. Namely, no matter the gestalt of a recording head may be what thing, it is because it can record now efficiently

certainly according to this invention.

[0033] Furthermore, this invention is effectively applicable also to the recording head of the full line type which has the die length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the configuration which fills the die length with the combination of two or more recording heads, and the configuration as one recording head formed in one are sufficient.

[0034] In addition, this invention is effective also when the thing of a serial type like an upper example also uses the recording head fixed to the body of equipment, the recording head exchangeable chip type to which the electric connection with the body of equipment and supply of the ink from the body of equipment are attained by the body of equipment being equipped, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one.

[0035] Moreover, as a configuration of the recording device of this invention, since the effectiveness of this invention can be stabilized further, it is desirable to add the regurgitation recovery means of a recording head, a preliminary auxiliary means, etc. If these are mentioned concretely, a preheating means to heat using the capping means, the cleaning means, the pressurization or the suction means, the electric thermal-conversion object, the heating elements different from this, or such combination over a recording head, and a reserve regurgitation means to perform the regurgitation different from record can be mentioned.

[0036] Moreover, although only one piece was prepared also about the class thru/or the number of a recording head carried, for example corresponding to monochromatic ink, corresponding to two or more ink which differs in an others and record color or concentration, more than one may be prepared the number of pieces. That is, although not only the recording mode of only mainstream colors, such as black, but a recording head may be constituted in one as a recording mode of a recording device or the paddle gap by two or more combination is sufficient, for example, this invention is very effective also in equipment equipped with at least one of each of the full color recording mode by the double color color of a different color, or color mixture.

[0037] Furthermore, in addition, in this invention example explained above, although ink is explained as a liquid It is ink solidified less than [ a room temperature or it ], and what is softened or liquefied at a room temperature may be used. Or by the ink jet method, since what carries out temperature control is common as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70 degrees C or less and it is in the stabilization regurgitation range about the viscosity of ink, ink may use what makes the shape of liquid at the time of use record signal grant. In addition, in order to prevent the temperature up by heat energy positively because you make it use it as energy of the change of state from a solid condition to the liquid condition of ink, or in order to prevent evaporation of ink, the ink which solidifies in the state of neglect and is liquefied with heating may be used.

Anyway, ink liquefies by grant according to the record signal of heat energy, and this invention can be applied also when using the ink of the property which will not be liquefied without grant of heat energy, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a record medium. The ink in such a case is good for a porosity sheet crevice or a through tube which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the condition of having been held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.

[0038] Furthermore, in addition, as a gestalt of this invention ink jet recording device, although used as an image printing terminal of information management systems, such as a computer, the gestalt of the reproducing unit combined with others, a reader, etc. and the facsimile apparatus which has a transceiver function further may be taken.



[0039]

[Effect of the Invention] According to this invention, the cumulative error produced for every activation of paper feed can perform the amount calculation of paper feeds by simple processing while always being governed within fixed limits, so that clearly from the above explanation.

[0040] Consequently, a big cumulative error is not produced in simple paper feed processing, but it becomes possible to record good grace.

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TECHNICAL FIELD

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[Industrial Application] This invention relates to a recording device with the configuration which amends the amount of paper feeds in detail about a recording device.

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PRIOR ART

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[Description of the Prior Art] As for the paper feed in a recording device, it is common to be carried out on the basis of the amount of unit paper feeds which the equipment has. That is, this amount of unit paper feeds will become settled by use of the gear which transmits the stepping motor used as a driving source, and this driving force, a paper feed roller, etc., and the amount of that integral multiple will be sent in actual paper feed.

[0003] On the other hand, also about directions of the amount of paper feeds in the above recording devices, it is directed as an integral multiple of a predetermined paper feed unit, and differs from the amount of unit paper feeds which this predetermined paper feed unit and the above-mentioned equipment have in many cases. This is because a recording device is connected and the specifications of host equipment, i.e., various information processors, using this as an information output unit etc. differ.

[0004] As mentioned above, when the unit quantity of directions paper feed differs from the actual amount of unit paper feeds of a recording device, an error will arise for every paper feed and the grace of the alphabetic character recorded as this is accumulated, and an image will be spoiled.

[0005] The configuration which makes this cumulative error fixed minute within the limits is indicated by JP,4-81518,B and JP,5-1740,B. Each configuration indicated by these official reports governs a cumulative error in the range of  $\pm 1/2$  of the amount of unit paper feeds in a recording device.

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EFFECT OF THE INVENTION

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[Effect of the Invention] According to this invention, the cumulative error produced for every activation of paper feed can perform the amount calculation of paper feeds by simple processing while always being governed within fixed limits, so that clearly from the above explanation.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, since the configuration for the cumulative error control indicated by each above-mentioned official report makes it into the range of  $\pm 1/2$  as mentioned above, the processing for evaluation of the error produced for every paper feed, i.e., magnitude with error, is [ judgment processing of size or fossete or data processing of rounding off ] needed from the above  $1/2$ , and there is [ a problem that an operation becomes comparatively complicated ].

[0007] The place which this invention is performed based on such a viewpoint, and is made into the purpose governs a cumulative error within fixed limits by simpler processing, and is to offer the recording device which can record always good grace by proper paper feed.

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MEANS

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[Means for Solving the Problem] Therefore, this invention is characterized by equipping with the following the recording device which records on recorded media using a recording head. The paper feed means which carries out paper feed of the recorded media to said recording head An operation means to compute the error at the time of these conversion as a cumulative error while converting the sum of the amount of directions paper feeds and cumulative error which are directed to the recording device concerned per paper feed of the recording device concerned A storage means to memorize the cumulative error which this operation means computed, and a vertical-format-unit means to make paper feed carry out to said paper feed means in the amount of paper feeds of said paper feed unit which said operation means converted

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OPERATION

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[Function] According to the above configuration, the cumulative error produced for every activation of paper feed can perform the amount calculation of paper feeds by simple processing while always being governed within fixed limits.

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EXAMPLE

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[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing.

[0011] Drawing 1 is the outline perspective view showing the ink jet recording device concerning one example of this invention.

[0012] This equipment is the printer of the full color serial type equipped with the exchangeable recording head corresponding to the ink of black (Bk) (cyanogen C) (Magenta M) (yellow Y) 4 color. The heads used for this printer are resolution 400dpi and 4kHz of drive frequencies, and have 128 deliveries.

[0013] In drawing 1 , C is four record head cartlidges corresponding to each ink of Y, M, C, and Bk, and the recording head and the ink tank which stored the ink which supplies ink to this are formed in one. It is equipped with each record head cartlidge C free [ attachment and detachment ] by the non-illustrated configuration to carriage 2. Carriage 2 is connected to some driving belts 52 which are engaged possible [ sliding ] in accordance with the guide shaft 11, and move by the non-illustrated horizontal-scanning motor. Thereby, the record head cartlidge C becomes movable [ for the scan in alignment with the guide shaft 11 ].

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[0016] The field where the cartridge C which adjoins the record section by the record head cartlidge C is movable is attended, and a recovery system unit is prepared. In a recovery system unit, 300 is the cap unit prepared respectively corresponding to two or more cartridges C which have a recording head, and it can be gone up and down in the vertical direction while being able to slide to the longitudinal direction in drawing with migration of carriage 2. And when carriage 2 is in a home position, it joins to the recording head section and capping of this is carried out. Moreover, in a recovery system unit, it is the blade cleaner which becomes with an absorber in order that 401 and 402 may clean the 1st and 2nd blades as a wiping member and 403 may clean the 1st blade 401, respectively.

[0017] Furthermore, 500 is a pump unit for absorbing ink etc. from the delivery of a recording head, and its near through the cap unit 300.

[0018] Drawing 2 is the block diagram showing the example of a configuration of the control system



in the above-mentioned ink jet recording apparatus.

[0019] It is the controller by which 100 makes the main control section here, and has RAM105 which prepared ROM103 which stored the program corresponding to CPU101 of a microcomputer gestalt, and its procedure for example which performs the sequence concerning the paper feed later mentioned in drawing 4 etc., a table and the electrical-potential-difference value of a heat pulse, and the fixed data of pulse width and others and the field which develops image data, the field of a working-level month, etc. 110 is host equipment (you may be the reader section of image read) which makes the source of supply of image data, and image data, other commands, a status signal, etc. are transmitted and received with a controller through an interface (I/F) 112.

[0020] 120 is a switch group which receives the command input by the large recovery switch 126 grade for directing the copy switch 124 for ordering it an electric power switch 122 and record (copy) initiation, and starting of large recovery, and the operator. 130 is a sensor group for detecting the sensor 132 for detecting locations of carriage 2, such as a home position and a start position, and the sensor 134 grade used including the leaf switch 130 for pump location detection, and a device status.

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[0022] Drawing 3 is the block diagram showing functionally the configuration of the amount control of paper feeds concerning one example of this invention, and this configuration is specifically constituted as the controller 100 shown in drawing 2 , and its software.

[0023] In drawing 3 , the amount of paper feeds of directions paper feeds outputted from host equipment, i.e., the amount, is converted into the unit of the amount of unit paper feeds which the printer shown in drawing 1 with the amount unit conversion means 1101 of paper feeds has. Next, based on the amount of paper feed remainders explained to a detail by this amount of conversions and drawing 4 , the actual amount of paper feeds is computed by the amount calculation means of paper feeds, and it is sent to a vertical-format-unit means. A vertical-format-unit means performs an actual vertical format unit through control of a drive of the vertical-scanning motor 160 (refer to drawing 2 ) etc. based on this amount of paper feeds.

[0024] Drawing 4 is a flow chart which shows the procedure of a configuration of being shown in drawing 3 .

[0025] At step S1, if the existence of the data reception from host equipment is judged and data reception is judged, it will shift to step S2. Moreover, when it is not data reception, it ends. At step S2, the receiving command from host equipment distinguishes whether it is a paper feed command. If it is a paper feed command, it will shift to step S3, and when it is not a paper feed command, processing of the amount amendment of paper feeds is ended similarly.

[0026] At step S3, the amount of directions paper feeds from host equipment is converted per the minimum paper feed of a recording device. This conversion \*\* the amount of directions paper feeds per [ above-mentioned ] the minimum paper feed, and makes that quotient a reduced property. Namely, it is referred to as WLFr (1) by making into the amount of paper feed remainders the remainder which sets to WLFm as an amount of paper feeds into which the quotient used as integer part was changed per the minimum paper feed of a recording device, and serves as a fraction.

[0027] In step S4, an amount WLFr (-1) is added and it is referred to as WLFr just because it was finally obtained by the amount WLFr of paper feed remainders (1) calculated above, and the last paper

feed. Furthermore, at step S5, this aggregate value WLFr is  $\frac{WLFr}{LFpitch}$  per [ LFpitch ] the minimum paper feed of a recording device, and it considers as the amount WLFr of paper feed remainders (-1) which uses the fraction which are the amount WLFhosei of paper feed amendments, and a remainder about the integer part used as a quotient at the time of next paper feed.

[0028] At step S6, the above-mentioned amount WLFm of paper feeds and the amount WLFhosei of paper feed amendments which were changed per the minimum paper feed in a recording device are added, and it considers as this final amount WLF of paper feeds. And this computed vertical format unit for the amount WLF of paper feeds is performed at step S7.

[0029] According to the above-mentioned example, while being able to govern an accumulation paper feed error between the minimum paper feed units from 0 of a recording device, the processing which the amount calculation of paper feeds takes will not need processing of size decision etc., but it will end with simple processing of a division etc., so that clearly [ the above explanation ]. Moreover, the amount of paper feeds always becomes less than the amount of directions paper feeds.

[0030] (in addition to this) In addition, especially this invention is equipped with means (for example, an electric thermal-conversion object, a laser beam, etc.) to generate heat energy as energy used also in an ink jet recording method in order to make the ink regurgitation perform, and brings about the effectiveness which was excellent in the recording head of the method which makes the change of state of ink occur with said heat energy, and the recording device. It is because the densification of record and highly minute-ization can be attained according to this method.

[0031] About the typical configuration and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By impressing at least one driving signal which gives the rapid temperature rise which supports recording information and exceeds nucleate boiling Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a recording head is made to produce film boiling and the air bubbles in the liquid (ink) corresponding to this driving signal can be formed by one to one as a result, it is effective. A liquid (ink) is made to breathe out through opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of air bubbles will be performed appropriately instantly, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and the 4345262 specification is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.

[0032] As a configuration of a recording head, the configuration using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight-line-like liquid flow channel or right-angle liquid flow channel) of a delivery which is indicated by each above-mentioned specification, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, the effectiveness of this invention is effective also as a configuration based on JP,59-138461,A which indicates the configuration whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which uses a common slit as the discharge part of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to a discharge part. Namely, no matter the gestalt of a recording head may be what thing, it is because it can record now efficiently

certainly according to this invention.

[0033] Furthermore, this invention is effectively applicable also to the recording head of the full line type which has the die length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the configuration which fills the die length with the combination of two or more recording heads, and the configuration as one recording head formed in one are sufficient.

[0034] In addition, this invention is effective also when the thing of a serial type like an upper example also uses the recording head fixed to the body of equipment, the recording head exchangeable chip type to which the electric connection with the body of equipment and supply of the ink from the body of equipment are attained by the body of equipment being equipped, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one.

[0035] Moreover, as a configuration of the recording device of this invention, since the effectiveness of this invention can be stabilized further, it is desirable to add the regurgitation recovery means of a recording head, a preliminary auxiliary means, etc. If these are mentioned concretely, a preheating means to heat using the capping means, the cleaning means, the pressurization or the suction means, the electric thermal-conversion object, the heating elements different from this, or such combination over a recording head, and a reserve regurgitation means to perform the regurgitation different from record can be mentioned.

[0036] Moreover, although only one piece was prepared also about the class thru/or the number of a recording head carried, for example corresponding to monochromatic ink, corresponding to two or more ink which differs in an others and record color or concentration, more than one may be prepared the number of pieces. That is, although not only the recording mode of only mainstream colors, such as black, but a recording head may be constituted in one as a recording mode of a recording device or the paddle gap by two or more combination is sufficient, for example, this invention is very effective also in equipment equipped with at least one of each of the full color recording mode by the double color color of a different color, or color mixture.

[0037] Furthermore, in addition, in this invention example explained above, although ink is explained as a liquid It is ink solidified less than [ a room temperature or it ], and what is softened or liquefied at a room temperature may be used. Or by the ink jet method, since what carries out temperature control is common as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70 degrees C or less and it is in the stabilization regurgitation range about the viscosity of ink, ink may use what makes the shape of liquid at the time of use record signal grant. In addition, in order to prevent the temperature up by heat energy positively because you make it use it as energy of the change of state from a solid condition to the liquid condition of ink, or in order to prevent evaporation of ink, the ink which solidifies in the state of neglect and is liquefied with heating may be used.

Anyway, ink liquefies by grant according to the record signal of heat energy, and this invention can be applied also when using the ink of the property which will not be liquefied without grant of heat energy, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a record medium. The ink in such a case is good for a porosity sheet crevice or a through tube which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the condition of having been held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.

[0038] Furthermore, in addition, as a gestalt of this invention ink jet recording device, although used as an image printing terminal of information management systems, such as a computer, the gestalt of the reproducing unit combined with others, a reader, etc. and the facsimile apparatus which has a transceiver function further may be taken.

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the outline perspective view of the ink jet recording device concerning one example of this invention.

[Drawing 2] It is the block diagram showing the control configuration of the above-mentioned equipment.

[Drawing 3] It is the block diagram showing functionally the configuration of the vertical format unit concerning one example of this invention.

[Drawing 4] It is the flow chart which shows the procedure of the above-mentioned vertical format unit.

[Description of Notations]

2 Carriage

15, 16, 17, 18 Conveyance roller

100 Controller

101 CPU

103 ROM

105 RAM

154 Motor Driver

160 Vertical-Scanning Motor

1101 The Amount Unit Conversion Means of Paper Feeds

1102 The Amount Calculation Means of Paper Feeds

1103 Vertical-Format-Unit Means

C Record head cartlidge

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[Translation done.]

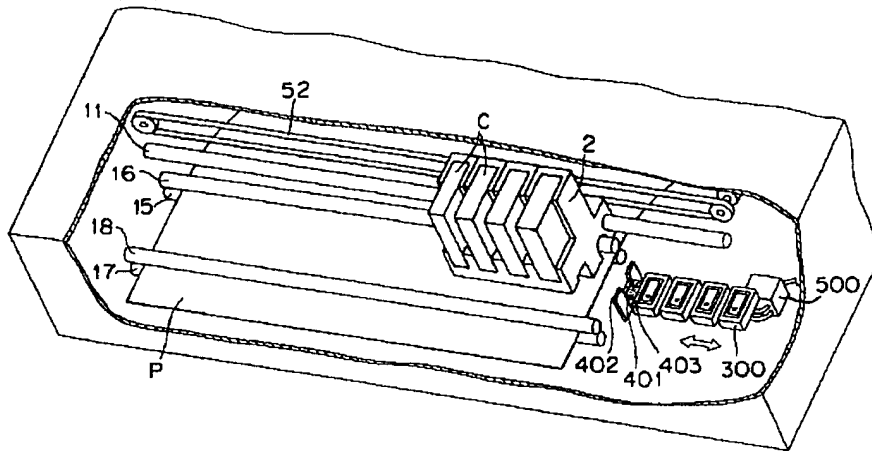
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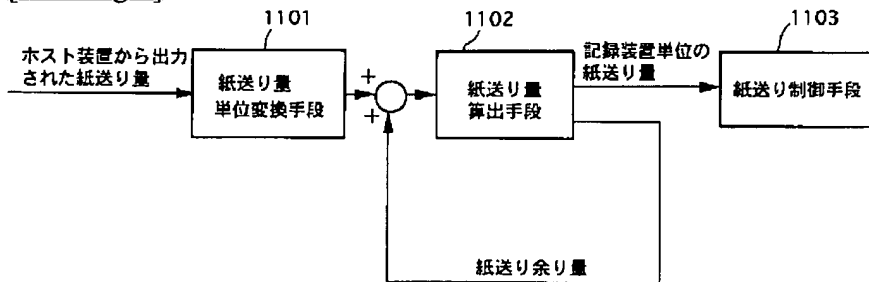
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DRAWINGS

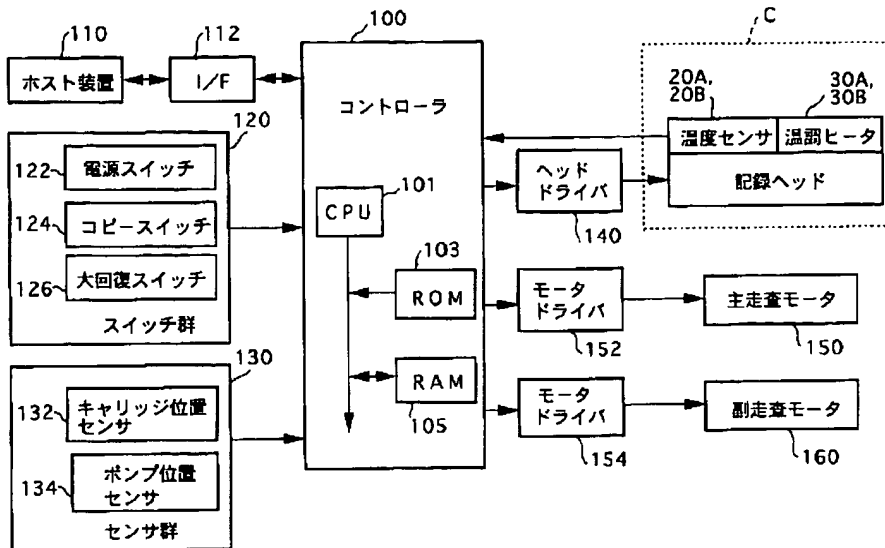
[Drawing 1]



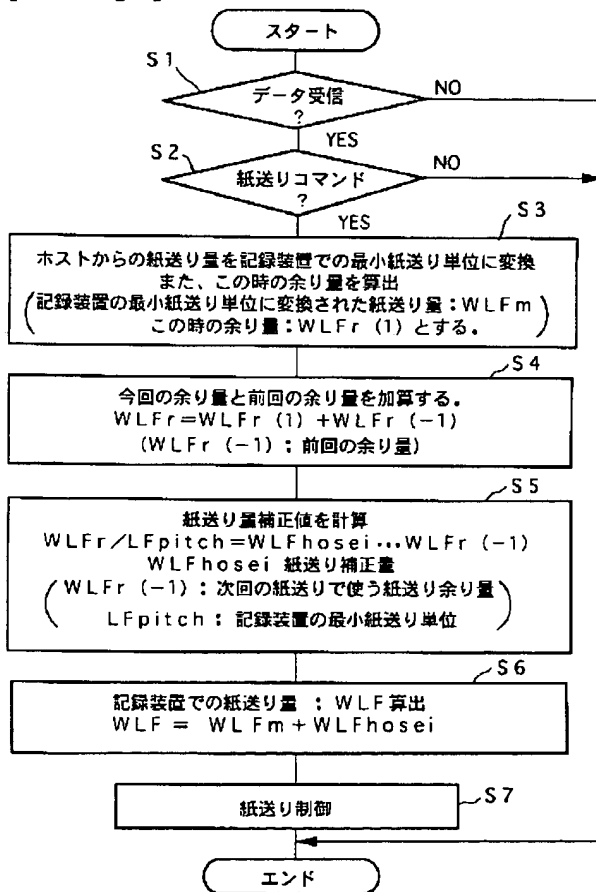
[Drawing 3]



[Drawing 2]



[Drawing 4]



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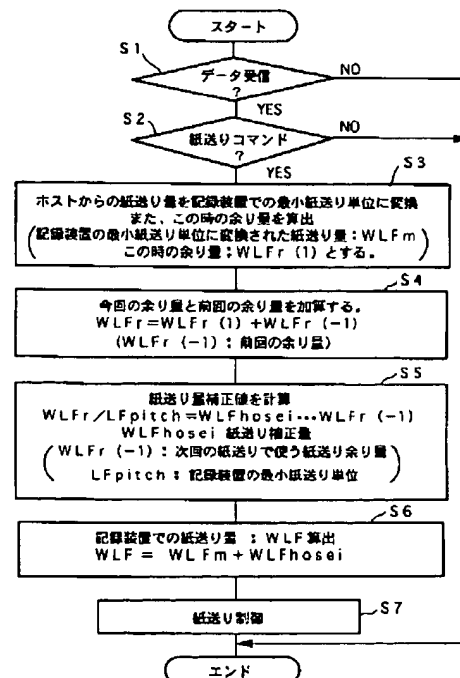
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(54)【発明の名称】 記録装置

(57)【要約】

【目的】 記録装置における紙送り量単位と、この装置に対する指示紙送り量の単位との違いから生じる紙送り量の累積誤差を、簡易な処理によって一定範囲内に治め、常に良好な記録品位を維持する。

【構成】 ホスト装置からの指示紙送り量を記録装置の最小紙送り単位に換算 (WLFm) するとともにそれによる誤差 (余り量 WLFr (-1)) を算出する (ステップ S3)。次に次回の紙送り時に生じた余り量 WLFr (-1) と余り量 WLFr (1) とを加算し (ステップ S4)、その結果を上記最小紙送り単位に換算した紙送り補正量 WLFhosei および次回で用いる余り量 WLFr (-1) を得る (ステップ S5)。そして、最終的に紙送り量 WLF = WLFm + WLFhosei を得る (ステップ S6)。





## 【特許請求の範囲】

【請求項1】 記録ヘッドを用いて被記録媒体に記録を行う記録装置において、  
被記録媒体を前記録ヘッドに対して紙送りする紙送り手段と、  
当該記録装置に対して指示される指示紙送り量と累積誤差との和を当該記録装置の紙送り単位に換算するとともに、該換算時の誤差を累積誤差として算出する演算手段と、  
該演算手段が算出した累積誤差を記憶する記憶手段と、  
前記演算手段が換算した前記紙送り単位の紙送り量で前記紙送り手段に紙送りを行わせる紙送り制御手段と、  
を具えたことを特徴とする記録装置。

【請求項2】 前記録ヘッドは、熱エネルギーを利用してインクに気泡を生じさせ、該気泡の生成に伴ってインクを吐出するものであることを特徴とする請求項1に記載の記録装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は記録装置に関し、詳しくは紙送り量を補正する構成を有した記録装置に関する。

## 【0002】

【従来の技術】記録装置における紙送りは、その装置が有する単位紙送り量を基準として行われるのが一般的である。すなわち、この単位紙送り量は、駆動源となるステッピングモータやこの駆動力を伝達するギア、紙送りローラ等の使用によって定まり、実際の紙送りでは、その整数倍の量が送られることになる。

【0003】一方、上記のような記録装置における紙送り量の指示についても、所定の紙送り単位の整数倍として指示され、この所定紙送り単位と上記装置が有する単位紙送り量とは異なることが多い。これは、記録装置を接続してこれを情報出力装置として用いるホスト装置、すなわち種々の情報処理装置の仕様等が異なるからである。

【0004】以上のように、指示紙送りの単位量と記録装置の実際の単位紙送り量とが異なる場合には、紙送り毎に誤差が生じ、これが累積されると記録される文字、画像の品位を損うことになる。

【0005】この累積誤差を一定の微小範囲内とする構成が、例えば特公平4-81518号公報、特公平5-1740号公報に記載されている。これら公報に記載される構成は、いずれも累積誤差を記録装置における単位紙送り量の $\pm 1/2$ の範囲に治めるものである。

## 【0006】

【発明が解決しようとする課題】しかしながら、上記各公報に記載される累積誤差制御のための構成は、上記のように $\pm 1/2$ の範囲とするため、紙送り毎に生じる誤差の評価のための処理、すなわち、誤差の大きさが上記 $1/2$ より大か小かの判定処理、あるいは四捨五入の演

算処理が必要となり、演算が比較的複雑になるという問題がある。

【0007】本発明は、このような観点に基づいて行われたものであり、その目的とするところは、より簡易な処理によって累積誤差を一定範囲内に治め、適正な紙送りによって常に良好な品位の記録を行うことが可能な記録装置を提供することにある。

## 【0008】

【課題を解決するための手段】そのために本発明は、記録ヘッドを用いて被記録媒体に記録を行う記録装置において、被記録媒体を前記録ヘッドに対して紙送りする紙送り手段と、当該記録装置に対して指示される指示紙送り量と累積誤差との和を当該記録装置の紙送り単位に換算するとともに、該換算時の誤差を累積誤差として算出する演算手段と、該演算手段が算出した累積誤差を記憶する記憶手段と、前記演算手段が換算した前記紙送り単位の紙送り量で前記紙送り手段に紙送りを行わせる紙送り制御手段と、を具えたことを特徴とする。

## 【0009】

【作用】以上の構成によれば、紙送りの実行毎に生じる累積誤差は常に一定の範囲内に治められるとともに、紙送り量算出を簡易な処理で行うことができる。

## 【0010】

【実施例】以下、図面を参照して本発明の実施例を詳細に説明する。

【0011】図1は本発明の一実施例に係るインクジェット記録装置を示す概略斜視図である。

【0012】この装置は交換可能な記録ヘッドを黒(Bk)、シアン(C)、マゼンタ(M)、イエロー(Y)4色のインクに対応して備えたフルカラーシリアルタイプのプリンタである。本プリンタに使用したヘッドは、解像度400dpi、駆動周波数4KHzで、128個の吐出口を有している。

【0013】図1において、CはY、M、C、Bkの各インクに対応した4個の記録ヘッドカートリッジであり、記録ヘッドとこれにインクを供給するインクを貯留したインクタンクとが一体に形成されている。各記録ヘッドカートリッジCはキャリッジ2に対して不図示の構成によって着脱自在に装着される。キャリッジ2は、ガイド軸11に沿って摺動可能に係合し、また、不図示の主走査モータによって移動する駆動ベルト52の一部と接続する。これにより、記録ヘッドカートリッジCはガイド軸11に沿った走査のための移動が可能となる。

【0014】15、16および17、18は記録ヘッドカートリッジCの走査による記録領域の図中奥側および手前側においてガイド軸11とほぼ平行に延在する搬送ローラである。搬送ローラ15、16および17、18は不図示の副走査モータによって駆動され記録媒体Pを搬送する。この搬送される記録媒体Pは記録ヘッドカートリッジCの吐出口面が配設された面に対向し記録面を

構成する。

【0015】かかる記録媒体Pの搬送（以下、紙送りともいう）は、図3および図4にて後述される構成によって、その紙送り量の制御が行われる。

【0016】記録ヘッドカートリッジCによる記録領域に隣接するカートリッジCの移動可能な領域に臨んで回復系ユニットが設けられる。回復系ユニットにおいて、300は記録ヘッドを有する複数のカートリッジCにそれぞれ対応して設けたキャップユニットであり、キャリッジ2の移動に伴って図中左右方向にスライド可能であるとともに、上下方向に昇降可能である。そしてキャリッジ2がホームポジションにあるときには、記録ヘッド部と接合してこれをキャッピングする。また、回復系ユニットにおいて、401および402は、それぞれワイピング部材としての第1および第2ブレード、403は第1ブレード401をクリーニングするために、例えば吸収体となるブレードクリーナである。

【0017】さらに、500はキャップユニット300を介して記録ヘッドの吐出口およびその近傍からインク等を吸収するためのポンプユニットである。

【0018】図2は上記インクジェット記録装置における制御系の構成例を示すブロック図である。

【0019】ここで、100は主制御部をなすコントローラであり、図4にて後述する紙送りに係るシーケンス等を実行する例えばマイクロコンピュータ形態のCPU101、その手順に対応したプログラムやテーブル、ヒートパルスの電圧値、パルス幅その他の固定データを格納したROM103、および画像データを展開する領域や作業用の領域等を設けたRAM105を有する。110は画像データの供給源をなすホスト装置（画像読取りのリーダ部であってもよい）であり、画像データその他コマンド、ステータス信号等はインターフェース（I/F）112を介してコントローラと送受信される。

【0020】120は電源スイッチ122、記録（コピー）開始を指令するためのコピースイッチ124および大回復の起動を指示するための大回復スイッチ126等、操作者による指令入力を受容するスイッチ群である。130はホームポジションやスタートポジション等キャリッジ2の位置を検出するためのセンサ132、およびリーフスイッチ130を含みポンプ位置検出のために用いるセンサ134等、装置状態を検出するためのセンサ群である。

【0021】140は記録データ等に応じて記録ヘッドの電気熱変換体を駆動するためのヘッドドライバである。また、ヘッドドライバの一部は温度ヒータ30A、30Bを駆動することにも用いられる。さらに、温度センサ20A、20Bから温度検出値はコントローラ100に入力する。150はキャリッジ2を主走査方向（図1の左右方向）に移動させるための主走査モータ、152はそのドライバである。160は副走査モータであ

り、記録媒体を搬送（副走査）するために用いられる。

【0022】図3は、本発明の一実施例に係る紙送り量制御の構成を機能的に示すブロック図であり、かかる構成は、具体的には図2に示したコントローラ100およびそのソフトウェアとして構成されるものである。

【0023】図3において、ホスト装置から出力される紙送り量、すなわち指示紙送り量は、紙送り量単位変換手段1101によって図1に示したプリンタが有している単位紙送り量の単位に換算される。次に、この換算量および図4にて詳細に説明する紙送り余量に基づき、紙送り量算出手段により実際の紙送り量が算出され、紙送り制御手段に送られる。紙送り制御手段は、この紙送り量に基づいて副走査モータ160（図2参照）の駆動等の制御を介し実際の紙送り制御を行う。

【0024】図4は、図3に示す構成の処理手順を示すフローチャートである。

【0025】ステップS1では、ホスト装置からのデータ受信の有無を判断し、データ受信を判断するとステップS2へ移行する。また、データ受信でない場合は終了する。ステップS2では、ホスト装置からの受信コマンドが紙送りコマンドか否かを判別する。紙送りコマンドであればステップS3へ移行し、紙送りコマンドでない場合は、同様に紙送り量補正の処理を終了する。

【0026】ステップS3では、ホスト装置からの指示紙送り量を記録装置の最小紙送り単位に換算する。この変換は、指示紙送り量を上記最小紙送り単位で除し、その商を換算値とするものである。すなわち、整数部となる商を記録装置の最小紙送り単位に変換された紙送り量としてのWLFmとし、また、少数部となる剰余を紙送り余り量としてWLFr(1)とする。

【0027】ステップS4では、上記で求めた紙送り余り量WLFr(1)と前回の紙送り最終的に得られた余り量WLFr(-1)を加算しWLFrとする。さらに、ステップS5では、この加算値WLFrを記録装置の最小紙送り単位Lf pitchで除し、商となる整数部を紙送り補正量WLFhosei、剰余である少数部を次回の紙送り時に使用する紙送り余り量WLFr(-1)とする。

【0028】ステップS6では、記録装置での最小紙送り単位に変換された上記紙送り量WLFmと紙送り補正量WLFhoseiを加算し、今回の最終的な紙送り量WLFとする。そして、ステップS7で、この算出された紙送り量WLF分の紙送り制御を行う。

【0029】以上の説明に明らかなように、上記実施例によれば、累積紙送り誤差は、記録装置の0から最小紙送り単位の間で治めることができるとともに、紙送り量算出に要する処理が大小判断等の処理を必要とせず、除算等の簡易な処理で済むことになる。また、紙送り量は、常に指示紙送り量よりも少なくなる。

【0030】（その他）なお、本発明は、特にインクジ

ェット記録方式の中でも、インク吐出を行わせるために利用されるエネルギーとして熱エネルギーを発生する手段（例えば電気熱交換体やレーザ光等）を備え、前記熱エネルギーによりインクの状態変化を生起させる方式の記録ヘッド、記録装置において優れた効果をもたらすものである。かかる方式によれば記録の高密度化、高精細化が達成できるからである。

【0031】その代表的な構成や原理については、例えば、米国特許第4723129号明細書、同第4740796号明細書に開示されている基本的な原理を用いて行うものが好ましい。この方式は所謂オンデマンド型、コンティニユアス型のいずれにも適用可能であるが、特に、オンデマンド型の場合には、液体（インク）が保持されているシートや液路に対応して配置されている電気熱交換体に、記録情報に対応して核沸騰を越える急速な温度上昇を与える少なくとも1つの駆動信号を印加することによって、電気熱交換体に熱エネルギーを発生せしめ、記録ヘッドの熱作用面に膜沸騰を生じさせて、結果的にこの駆動信号に一对一に対応した液体（インク）内の気泡を形成できるので有効である。この気泡の成長、収縮により吐出用開口を介して液体（インク）を吐出させて、少なくとも1つの滴を形成する。この駆動信号をパルス形状とすると、即時適切に気泡の成長収縮が行われるので、特に応答性に優れた液体（インク）の吐出が達成でき、より好ましい。このパルス形状の駆動信号としては、米国特許第4463359号明細書、同第4345262号明細書に記載されているようなものが適している。なお、上記熱作用面の温度上昇率に関する発明の米国特許第4313124号明細書に記載されている条件を採用すると、さらに優れた記録を行うことができる。

【0032】記録ヘッドの構成としては、上述の各明細書に開示されているような吐出口、液路、電気熱交換体の組合せ構成（直線状液流路または直角液流路）の他に熱作用部が屈曲する領域に配置されている構成を開示する米国特許第4558333号明細書、米国特許第4459600号明細書を用いた構成も本発明に含まれるものである。加えて、複数の電気熱交換体に対して、共通するスリットを電気熱交換体の吐出部とする構成を開示する特開昭59-123670号公報や熱エネルギーの圧力波を吸収する開孔を吐出部に対応させる構成を開示する特開昭59-138461号公報に基いた構成としても本発明の効果は有効である。すなわち、記録ヘッドの形態がどのようなものであっても、本発明によれば記録を確実に効率よく行うことができるようになるからである。

【0033】さらに、記録装置が記録できる記録媒体の最大幅に対応した長さを有するフルラインタイプの記録ヘッドに対しても本発明は有効に適用できる。そのような記録ヘッドとしては、複数記録ヘッドの組合せによつ

てその長さを満たす構成や、一体的に形成された1個の記録ヘッドとしての構成のいずれでもよい。

【0034】加えて、上例のようなシリアルタイプのもので、装置本体に固定された記録ヘッド、あるいは装置本体に装着されることで装置本体との電気的な接続や装置本体からのインクの供給が可能になる交換自在のチップタイプの記録ヘッド、あるいは記録ヘッド自体に一体的にインクタンクが設けられたカートリッジタイプの記録ヘッドを用いた場合にも本発明は有効である。

10 【0035】また、本発明の記録装置の構成として、記録ヘッドの吐出回復手段、予備的な補助手段等を付加することは本発明の効果を一層安定できるので、好ましいものである。これらを具体的に挙げれば、記録ヘッドに対してのキャッピング手段、クリーニング手段、加圧或は吸引手段、電気熱交換体或はこれとは別の加熱素子或はこれらの組み合わせを用いて加熱を行う予備加熱手段、記録とは別の吐出を行なう予備吐出手段を挙げることができる。

20 【0036】また、搭載される記録ヘッドの種類ないし個数についても、例えば単色のインクに対応して1個のみが設けられたものの他、記録色や濃度を異にする複数のインクに対応して複数個数設けられるものであってもよい。すなわち、例えば記録装置の記録モードとしては黒色等の主流色のみの記録モードだけではなく、記録ヘッドを一体的に構成するか複数個の組み合わせによるかいずれでもよいが、異なる色の複色カラー、または混色によるフルカラーの各記録モードの少なくとも一つを備えた装置にも本発明は極めて有効である。

30 【0037】さらに加えて、以上説明した本発明実施例においては、インクを液体として説明しているが、室温やそれ以下で固化するインクであって、室温で軟化もしくは液化するものを用いてもよく、あるいはインクジェット方式ではインク自体を30℃以上70℃以下の範囲内で温度調整を行ってインクの粘性を安定吐出範囲にあるように温度制御するものが一般的であるから、使用記録信号付与時にインクが液状をなすものを用いてもよい。加えて、熱エネルギーによる昇温を、インクの固形状態から液体状態への状態変化のエネルギーとして使用せしめることで積極的に防止するため、またはインクの蒸発を防止するため、放置状態で固化し加熱によって液化するインクを用いてもよい。いずれにしても熱エネルギーの記録信号に応じた付与によってインクが液化し、液状インクが吐出されるものや、記録媒体に到達する時点ではすでに固化し始めるもの等のような、熱エネルギーの付与によって初めて液化する性質のインクを使用する場合も本発明は適用可能である。このような場合のインクは、特開昭54-56847号公報あるいは特開昭60-71260号公報に記載されるような、多孔質シート凹部または貫通孔に液状又は固形物として保持された状態で、電気熱交換体に対して対向するような形態としても

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よい。本発明においては、上述した各インクに対して最も有効なのは、上述した膜沸騰方式を実行するものである。

【0038】さらに加えて、本発明インクジェット記録装置の形態としては、コンピュータ等の情報処理機器の画像出力端末として用いられるものの他、リーダ等と組合せた複写装置、さらには送受信機能を有するファクシミリ装置の形態を採るもの等であってもよい。

【0039】

【発明の効果】以上の説明から明かなように、本発明によれば、紙送りの実行毎に生じる累積誤差は常に一定の範囲内に治められるとともに、紙送り量算出を簡易な処理で行うことができる。

【0040】この結果、簡易な紙送り処理で大きな累積誤差を生ぜず、良好な品位の記録を行うことが可能となる。

【図面の簡単な説明】

【図1】本発明の一実施例に係るインクジェット記録装置の概略斜視図である。

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【図2】上記装置の制御構成を示すブロック図である。

【図3】本発明の一実施例に係る紙送り制御の構成を機能的に示すブロック図である。

【図4】上記紙送り制御の処理手順を示すフローチャートである。

【符号の説明】

2 キャリッジ

15, 16, 17, 18 搬送ローラ

100 コントローラ

101 CPU

103 ROM

105 RAM

154 モータドライバ

160 副走査モータ

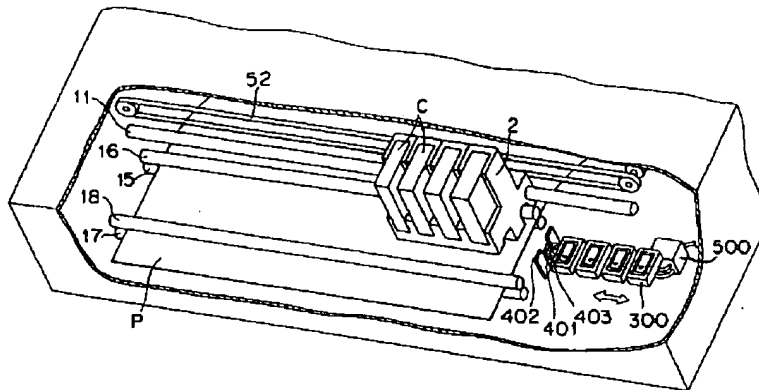
1101 紙送り量単位変換手段

1102 紙送り量算出手段

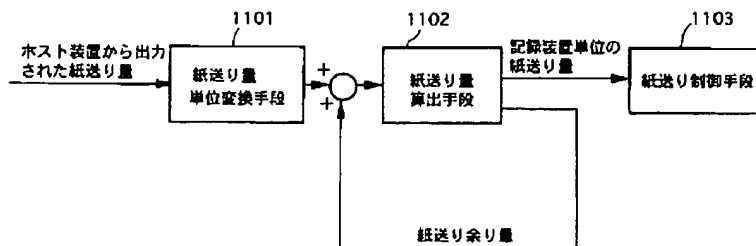
1103 紙送り制御手段

C 記録ヘッドカートリッジ

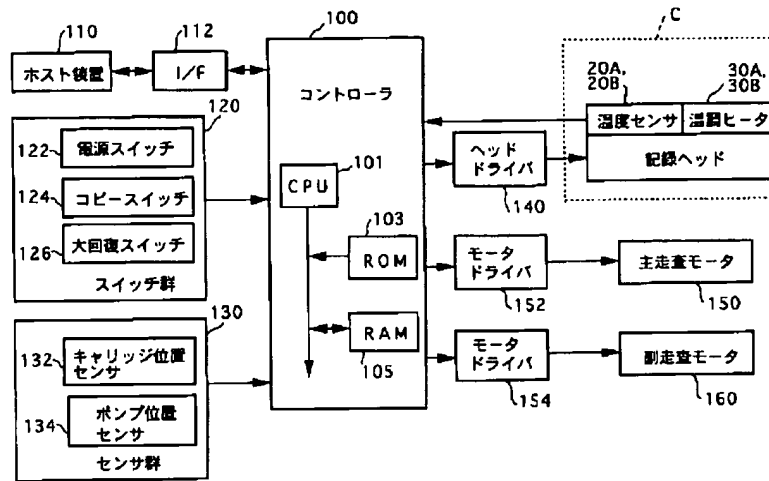
【図1】



【図3】



【図2】



【図4】

